

AMENDMENTS TO THE CLAIMS

1-8. (Cancelled)

9. (Currently Amended): A polycrystalline silicon film on a substrate, the polycrystalline film containing metal of which density ranges 2×10^{17} to 5×10^{19} atoms/cm³, and an electrical conductivity activation energy between 0.52eV and 0.71eV, the polycrystalline silicon film comprising a plurality of needle-shaped silicon crystallites, wherein the polycrystalline silicon film is formed by crystallizing an amorphous silicon film containing the metal by thermal treatment and applying an electric field ~~wherein the metal is a catalyst for metal-induced crystallization of amorphous silicon.~~

10. (New): The polycrystalline silicon film according to claim 9, wherein the metal includes one of nickel (Ni), gold (Au) and cobalt (Co).

11. (New): The polycrystalline silicon film according to claim 9, wherein the metal works as a catalyst during the crystallization.

12. (New): The polycrystalline silicon film according to claim 9, further comprising a buffer layer between the substrate and the polycrystalline silicon film.

13. (New): The polycrystalline silicon film according to claim 10, wherein the needle-shaped silicon crystallites are formed by movement of a silicide of the metal.

14. (New): A method for forming a polycrystalline silicon layer, comprising:
preparing a substrate having an amorphous silicon layer;
adding a plurality of metal atoms to the amorphous silicon layer; and
applying a heat and an electric field to the amorphous silicon layer so as to crystallize the amorphous silicon layer into a polycrystalline silicon layer using a MIC (Metal Induced Crystallization) method, the polycrystalline silicon layer including a plurality of needle-shaped silicon crystallites,

wherein the polycrystalline silicon layer has the metal atoms in the range of 2×10^{17} to 5×10^{19} atoms/cm³ and an electrical conductivity activation energy between 0.52eV and 0.71eV.

15. (New): The method according to claim 14, wherein a buffer layer is formed between the substrate and the polycrystalline silicon layer.

16. (New): The method according to claim 14, wherein the metal atoms includes one of nickel (Ni), gold (Au) and cobalt (Co).

17. (New): The method according to claim 14, wherein the metal atoms works as a catalyst for the MIC.

18. (New): The method according to claim 16, wherein a temperature range of the heat is between 400 and 500 °C.

19. (New): The method according to claim 14, wherein the needle-shaped silicon crystallites are formed by movement of nickel silicide (NiSi₂).